EXHIBIT 3

CAPACITY DESIGN STUDY

PEAK HOUR FACTOR: 0.92

PHASE: 8
SEC. CYCLE: AM. 110 sec.
P.M. 110 sec.
SIGNAL TYPE: Actuated

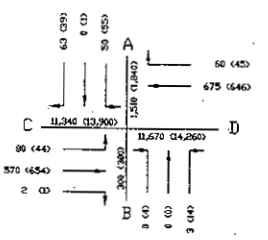
AREA: NON CBD
AVERAGE INTERSECTION DELAY: AM. 48.8 sec.
P.M. 72.6 sec.

INTERSECTION LEVEL OF SERVICE: AM. D
P.M. E

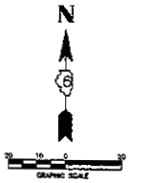
Program Used: SYNCHRO 6.0

APPROACH		EB IL 108	'C'	WB IL 108	'D'	NB P.E.	'B'	SB CHILES	'A'
Bus Stop Condition		-		-		-		-	
Parking Maneuvers/hr		-		-		-		-	
Pedestrians		-		-		-		-	
Actuat Type		3		3		3		3	
Lane Utilization Factor		1.00				1.00	1.00	1.00	
Base Saturation Flow Rate		1900				1900	1900	1900	
D-Distance		138'		843'		35'	37'	149'	
Lane Group		L		TR		TR	LTR	LTR	
Lane Widths		11.9'		11.2'		11.9'	22.9'	16.5'	
Green Time (seconds)	AM	7.5		34.5		56.5	10.5	10.5	
	PM	7.5		35.5		84.5	7.5	7.5	
Lane Group Delay (seconds)	AM	64.1		100.4		5.1	44.8	58.6	
	PM	53.5		148.2		3.3	50.3	78.2	
v/c Ratio	AM	0.89		1.09		0.71	0.62	0.88	
	PM	0.47		1.21		0.62	0.15	0.89	
Level of Service	AM	E		F		A	D	E	
	PM	D		F		A	D	E	
2026 Hour Traffic	AM	60		572		735	3	115	
	PM	44		855		891	16	95	
2006 9th Max. Hourly traffic	AM	295		330		2		61	
	PM	315		314		19		45	

D DISTANCE= 95% QUEUE DISTANCE FROM SYNCHRO 6.0



2026 D.H.V. AM (PM)
ADT 2006 (2026)



ELEMENTS CONTROLLING DESIGN

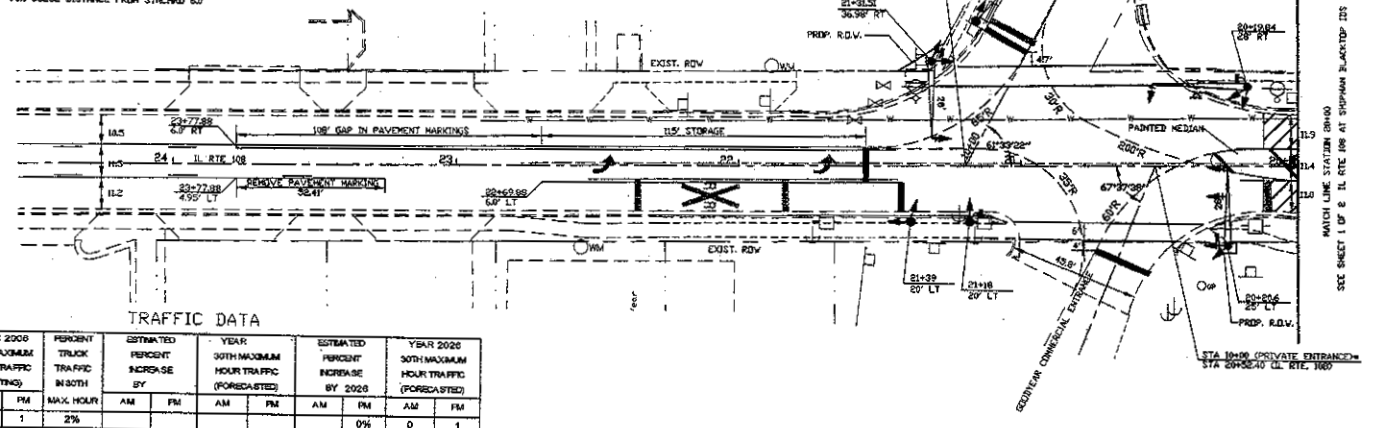
1. DESIGN DESIGNATION
   F.A.P. ROUTE 765 (IL RTE 108)–OTHER PRINCIPAL ARTERIAL
   ADT 14,260 (2026) WITH CHILES STREET–LOCAL ROAD ADT 1,840 (2026)
2. F.A.P. ROUTE 765 (IL RTE 108) IS THE PREFERENCE ROUTE.
3. ANTICIPATED YEAR OF CONSTRUCTION 2006.
4. TRAFFIC CONTROL TO BE TRAFFIC SIGNAL FULLY ACTUATED; CURRENTLY MEETS WARRANT 2 AND 3.
5. DESIGN VEHICLE FOR INTERSECTION IS WB-55, RADIUS RETURNS: NOT TO BE IMPROVED DUE TO RECENT RESURFACING PROJECT BY IDOT.
6. DESIGN SPEED FOR F.A.P. RTE 765 (IL RTE 108) IS 30 MPH, POSTED 25 MPH.
7. DESIGN SPEED FOR CHILES STREET IS 30 MPH, POSTED 30 MPH.
8. THE PROPOSED SIGNAL AT THE INTERSECTION WILL BE INTERCONNECTED WITH THE AT-GRADE RAILROAD CROSSING ON IL 108 ALONG WITH PROP. SIGNAL AT SHIPMAN BLACKTOP.
9. AUTOTURN WAS UTILIZED IN THE DESIGN OF THIS INTERSECTION.
10. THE IMPROVEMENT CONSISTS OF ADDING A NORTHBOUND RIGHT TURN LANE TO SHIPMAN BLACKTOP, STRIPING IL 108 FOR A WESTBOUND LEFT TURN LANE, SIGNALIZING THE INTERSECTIONS OF IL 108 WITH SHIPMAN BLACKTOP AND CHILES STEET ALONG WITH AN INTERCONNECT WITH THE RAILROAD CROSSING WARNING SIGNALS.
11. ALL EFFORTS TO COORDINATE THE SIGNAL TIMING WITH THE ICC AND UP RAILROAD HAVE BEEN TAKEN.
12. DUE TO THE ADVANCED SIGNALIZED INTERSECTION COORDINATION ANALYSIS REQUIRED FOR THE TRAFFIC STUDY AND ICC WARNING TIME STUDY APPROVALS, SYNCHRO 6.0 WAS UTILIZED FOR COMPLETION OF THE IDS CAPACITY BLOCK, RATHER THAN HCS 2000. SYNCHRO CAN EFFECTIVELY MODEL CLOSE SIGNAL SPACING, SIGNAL PROGRESSION, AND TIMING OPTIMIZATION WHEREAS HCS 2000 CANNOT.
13. WESTBOUND LEFT TURNS RESTRICTED WITH ADDITIONAL SIGNAGE ON THE MAST ARM.

GENERAL NOTES

1. PROFILES ARE NOT PROVIDED, DUE TO THE PROFILES REMAINING AS CONSTRUCTED.
2. EXIST. CONCRETE CURB TYPE B6.18 USED ON OUTER EDGES OF PAVEMENT.
3. ALL DIMENSIONS ARE SHOWN E-E OF PAVEMENT UNLESS OTHERWISE INDICATED.
4. ALL ENTRANCES TO BE IN COMPLIANCE WITH IDOT POLICY "ACCESS TO STATE HIGHWAYS".
5. ALL PAINT PAVEMENT MARKINGS SHALL CONFORM TO THE DISTRICT 6 PAINT PAVEMENT MARKINGS STANDARDS AND THE M.U.T.C.D.
6. ALL RIGHT OF WAY SHOWN IS APPROXIMATE AND WILL BE FINALIZED IN THE CONSTRUCTION PLANS.
7. PARKING SHOULD BE RESTRICTED BOTH EASTBOUND AND WESTBOUND ALONG IL ROUTE 108 FROM RR TRACKS TO LOCUST STREET.

DESIGN EXCEPTIONS

1. OVERALL LEVEL OF SERVICE (LOS) FOR INTERSECTION IS AN "E" FOR P.M. PEAK. THIS IS DUE TO THE EXTRA TIME PROVIDED TO CLEAR R.R. INFLUENCE ZONE IN BETWEEN SHIPMAN BLACKTOP AND CHILES STREET. SOME APPROACHES ARE LESS THAN LOS OF "D" IN BOTH A.M. AND P.M. PEAK.
2. 115' OF STORAGE PROVIDED FOR E.B. LEFT TURN LANE. EXTRA STORAGE REQUIREMENTS CAN SPILL BACK INTO TWO-WAY-LEFT-TURN LANE IF NEEDED.



TRAFFIC DATA

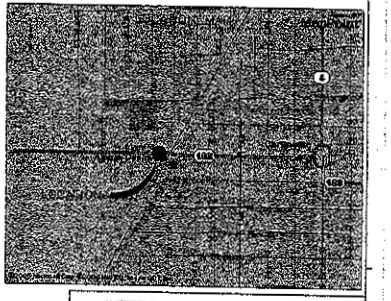
MOVEMENT	YEAR 2006 30TH MAXIMUM HOUR TRAFFIC (EXISTING) AM	PM	PERCENT TRUCK TRAFFIC IN 30TH MAX. HOUR	ESTIMATED PERCENT INCREASE BY AM	PM	YEAR 30TH MAXIMUM HOUR TRAFFIC (FORECASTED) AM	PM	ESTIMATED PERCENT INCREASE BY 2026 AM	PM	YEAR 2026 30TH MAXIMUM HOUR TRAFFIC (FORECASTED) AM	PM
AB	0	1	2%						0%	0	1
AD	41	45	2%					22%	22%	50	55
AC	52	32	2%					21%	22%	63	39
BA	0	0	2%							0	0
BC	0	4	2%						0%	0	4
BD	3	14	2%					0%	0%	3	14
CD	466	537	5%					22%	22%	570	654
CA	66	38	2%					21%	22%	80	44
CB	2	1	2%					0%	0%	2	1
DC	551	534	5%					23%	21%	676	646
DB	0	0	2%							0	0
DA	49	37	2%					22%	22%	60	45
TOTAL A	206	151								253	184
TOTAL B	5	20								5	20
TOTAL C	1139	1144								1390	1388
TOTAL D	1112	1167								1358	1414

PROPOSED PHASING FOR IL 108 AT CHILES

	YELLOW	RED		YELLOW	RED		YELLOW	RED				YELLOW	RED		YELLOW	RED		YELLOW	RED		YELLOW	RED	CYCLE LENGTH
AM	7.5	3.5	1.0	5.0	0.0	0.0	34.5	3.5	1.0	3.5	3.5	1.0	10.5	3.5	1.0	0.0	0.0	0.0	15.0	0.0	0.0	3.5	3.5	1.0	110.0
PM	7.5	3.5	1.0	5.0	0.0	0.0	35.5	3.5	1.0	3.5	3.5	1.0	7.5	3.5	1.0	0.0	0.0	0.0	17.0	0.0	0.0	3.5	3.5	1.0	110.0

PROPOSED PHASING FOR IL 108 AT SHIPMAN BLACKTOP

	YELLOW	RED		YELLOW	RED		YELLOW	RED				YELLOW	RED		YELLOW	RED		YELLOW	RED		YELLOW	RED	CYCLE LENGTH
AM	12.0	0.0	0.0	0.5	3.5	1.0	34.5	3.5	1.0	0.0	0.0	0.0	15.0	0.0	0.0	3.5	3.5	1.0	10.5	3.5	1.0	0.0	0.0	0.0	110.0
PM	12.0	0.0	0.0	0.5	3.5	1.0	35.5	3.5	1.0	0.0	0.0	0.0	12.0	0.0	0.0	3.5	3.5	1.0	12.5	3.5	1.0	0.0	0.0	0.0	110.0



INTERSECTION DESIGN STUDY

FAP ROUTE 765 (IL ROUTE 108)
WITH
CHILES STREET

SEC. NO. _____ PROJ. NO. _____
SCALE : 1"=20' COUNTY : MACOUPIN
S/N : _____ REV. NO. 12/14/05
11/14/05
DESIGNED BY _____ DATE: 8/15/05
7/27/05
SATISFACTORY _____ DATE 12/15/05
SATISFACTORY _____ DATE
APPROVED _____ DATE

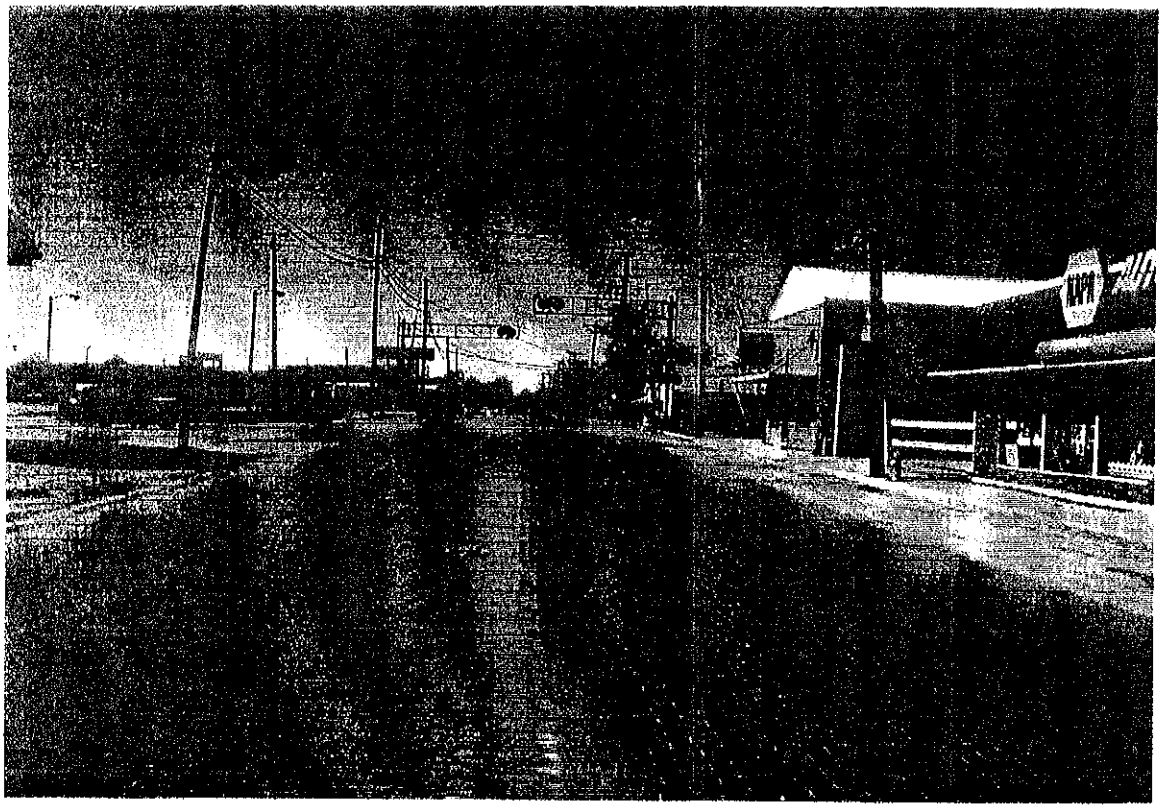
DGN FILE NAME: 108-34-05.DGN
I.D.S. SHEET 1 OF 1
CBB JOB NO. 34-05-3

CBB Civil Engineers

EXHIBIT 4

City of Carlinville, Illinois
Illinois 108 & Shipman Road

Warning Time Study
DOT Railroad Crossing # 294 388 A



CBB

Crawford, Bunte, Brammeier
Traffic and Transportation Engineers

ILLINOIS 108 & Shipman Road/Chiles Street
Warning Time Study

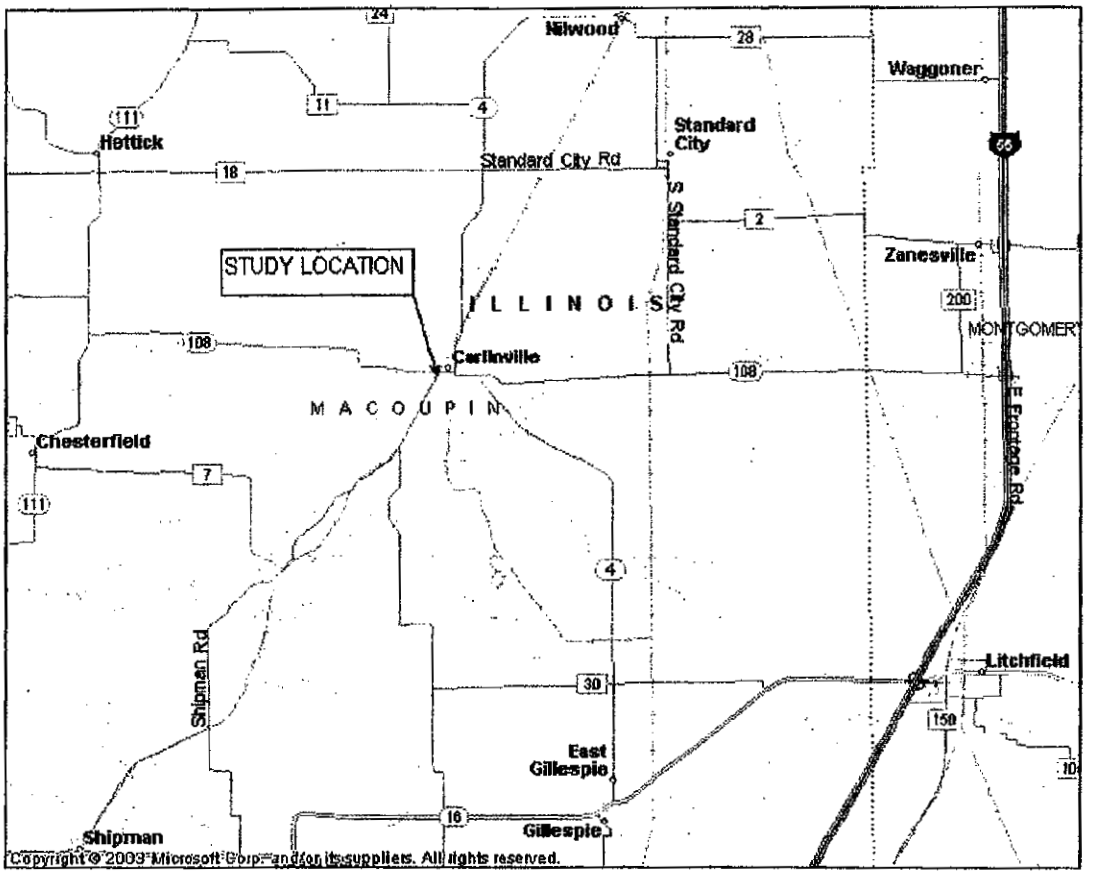


TABLE OF CONTENTS

ILLINOIS 108 & Shipman Road/Chiles Street Warning Time Study

1.0 PROJECT SUMMARY

1.1 INTRODUCTION

The purpose of this study is to determine the *maximum highway traffic signal preemption time* for the study area and to compare to the *minimum warning time* provided by the railroad agency. The Manual on Uniform Traffic Control Devices (MUTCD) defines the minimum warning time as the least amount of time active warning devices shall operate prior to the arrival of a train at a highway-rail grade crossing. The City of Carlinville will need to petition the Illinois Commerce Commission for the installation of traffic signals and any additional warning time necessary.

This particular highway-rail grade crossing is operated by Union Pacific Railroad (crossing # 294388A) and is located between the two proposed signalized intersections of IL 108 at Shipman Road and Chiles Street in Carlinville, Illinois. In addition to determining appropriate preemption operations, this study will identify the appropriate pavement marking, signage, and signal operation necessary for this location to conform to MUTCD standards for highway-rail grade crossings.

1.2 EXISTING AND PROPOSED CONDITIONS

The intersections of IL 108 at Shipman Road and Chiles Street are currently stop-controlled intersections located east and west of the Union Pacific Railroad crossing, respectively. This Union Pacific Railroad crossing has two tracks at IL 108 aligned at a 61°28□6□ skew, which are, located approximately 105□from the centerline of Shipman Road and 150□from the centerline of Chiles Street. A Goodyear Tire Store entrance is located at the south leg of the Chiles Street intersection, slightly offset in alignment. Similarly, the north leg of the Shipman Road intersection consists of an exit for the Wood Duck Tavern. Both legs of these intersections will be included in the proposed signalization project. The posted speed limit along IL 108 at this location is 30 miles per hour (mph). IL 108, east of the railroad crossing, consists of a brick pavement while it is bituminous west of the railroad crossing. It is noted that the railroad crossing is currently equipped with cantilevered flashing lights, gates, and stop bars at both the eastbound and westbound approaches to the tracks.

According to the signal warrant analysis prepared for the Wal-Mart Supercenter along Shipman Road, signalization would be justified through Warrants 2 and 3 for the construction year. Due to its proximity to the Union Pacific Railroad crossing, the intersection at Chiles Street will be included in the proposed signalization of Shipman Road. In addition, the study recommended the construction of a westbound left turn lane at the intersection of IL 108 and Shipman Road as well as separate left-and right-turn lanes at the northbound approach of Shipman Road.
No geometric modifications were proposed for the Chiles Street intersection due to its recent construction. All of the signal and roadway recommendations contained in

the traffic study were included in the Intersection Design Study (IDS) that was prepared for these proposed intersections to operate as one signal. All of the recommendations contained in this report are based on the geometrics contained in the IDS for this location. Any changes to the IDS geometrics would require the recalculation of the proposed preemption timings. Timed overlaps are recommended for the new signal's normal operation in order to eliminate vehicle storage between the intersections at Chiles Street and Shipman Road.

1.3 RECOMMENDATIONS

It is recommended that the proposed traffic signal and adjacent rail crossing should consist of the following in order to conform to MUTCD standards:

- Based on the MUTCD (Section 8D.07), the normal sequence of highway traffic signal operations should be preempted upon a train's approach when the signal is located within 200 ft. of a railroad grade crossing. This is in order to avoid the entrapment of vehicles on the railroad crossing.

- Signals are warranted at this location since there is not adequate clear storage distance between the intersection and the railroad tracks per MUTCD 8D.07. A timed overlap will be used to terminate the outer signals before the far side intersection signals, to clear the storage area between the track and the intersections during every cycle. During preemption, the traffic signal controller shall terminate, utilizing normal clearance intervals, all phases that conflict with the track clear green phase. Actuated pedestrian signals are to be installed.

- The following signs should be installed:
  - R8-8 - "Do Not Stop on Tracks" at the eastbound and westbound approaches to the railroad crossing.
  - R10-6 "Stop Here on Red" at the eastbound and westbound stop bars, prior to the railroad crossing.
  - R10-11c "No Right on Red" symbol sign for southbound exit across from Shipman Road and northbound exit across from Chiles Street.
  - W10-2 "Highway rail advance warning signs in advance of the railroad crossing in the eastbound and westbound approaches on IL 108.
  - "Caution, Walk Time Shortened When Train Approaches" at each pedestrian crosswalk.

- It is recommended that supplemental pavement markings be installed at the railroad crossing to emphasize to motorists that vehicles should not stop in this area. The "cross-hatched" pavement markings should consist of 6" white diagonals with a 4" border per IDOT Policy.

ILLINOIS 108 & Shipman Road/Chiles Street
Warning Time Study

2.0 DESCRIPTION OF PROPOSED CONDITIONS

2.1 PHYSICAL CHARACTERISTICS

Type:	61°28□36□skew, traffic signal control
Location:	Carlinville, Illinois
Pedestrian Crossing:	east-west crossing Chiles and Shipman
School Crossing:	east-west crossing Chiles and Shipman
Bike Path Crossing:	none
Pavement Markings:	Stop bars on all approaches White lane lines and double yellow centerline on IL 108 White diagonals through proposed crossing
Preemption Blank Out Signs:	N/A
Signing Present:	N/A
Roadway Lighting:	Luminaires on power poles at intersections
Sight Distance:	Acceptable
Rail Proximity:	70□from nearest rail to Chiles intersection (40 ft. storage distance) and 45□from nearest rail to Shipman intersection (no storage distance).
RR Crossing:	One mainline track, one industrial spur track
RR Lights:	Yes
RR Gates:	Yes
RR Pedestrian Gate:	No

2.2 RAILROAD SIGNALS

Track Speed Limit:	79 mph
Average number of trains per day:	12-14 trains per day, including 6 Amtrak trains

Crossbuck warning signs, automatic flashing light signals and gates are installed on both sides of IL 108.

ILLINOIS 108 & Shipman Road/Chiles Street
Warning Time Study

3.0 TABLES AND FIGURES

3.1 TRAFFIC SIGNAL RECOMMENDED TIMINGS

Based on the proposed geometrics contained in the IDS for the intersections of IL 108 at Shipman Road and Chiles Street, the following timing is recommended for the maximum preemption time.

Maximum Preemption Time (Right of Way Transfer Time + Queue Clearance Time + Separation Time)	
Warning Time Component	**Time (sec)**
Right of Way Transfer Time:	
Delay*	1.0
Minimum Green	1.0
Yellow Interval	3.5
All Red Interval	2.7
Total:	**8.2**
Queue Clearance Time:	**13.0**
Separation Time:	**9.0**
Minimum Warning Time Required:	**30.2**
*-One second will be programmed into railroad preemptor to limit false calls	

As can be seen above, the Right-of-Way Transfer Time amounts to 8.2 seconds. It should be noted that the vehicle clearance intervals (Yellow and All Red) were calculated according to the IDOT Bureau of Operations□Policy and Procedures. Also, the time for minimum green is a recommended value for entering into the preemptor to override normal operation during a train□s approach.

The Queue Clearance Time was calculated assuming that a vehicle would be cleared through a distance (220 ft) along IL 108 from the beginning of the proposed cross-hatched railroad striping to the edge of pavement for the cross street. This distance is commonly referred to as the Minimum Track Clearance Distance (MTCD) and Clear Storage Distance. The resultant Queue Clearance Time was derived by field measurement of vehicles traversing the rail crossing, which were influenced by a crossing train.

The Separation Time was provided by the ICC as a default value for the purposes of this study.

ILLINOIS 108 & Shipman Road/Chiles Street
Warning Time Study

Key Terms*

Maximum Highway Traffic Signal Preemption Time □the maximum amount of time needed following initiation of the preemption sequence for the highway traffic signals to complete the timing of the right of way transfer time, queue clearance time, and separation time.

Right of Way Transfer Time - The maximum amount of time needed for the worst case condition prior to display of the track clearance green interval. This includes any railroad or highway traffic signal control equipment time to react to a preemption call, and any traffic control signal green, pedestrian walk and clearance, yellow change, and red clearance intervals for conflicting traffic.

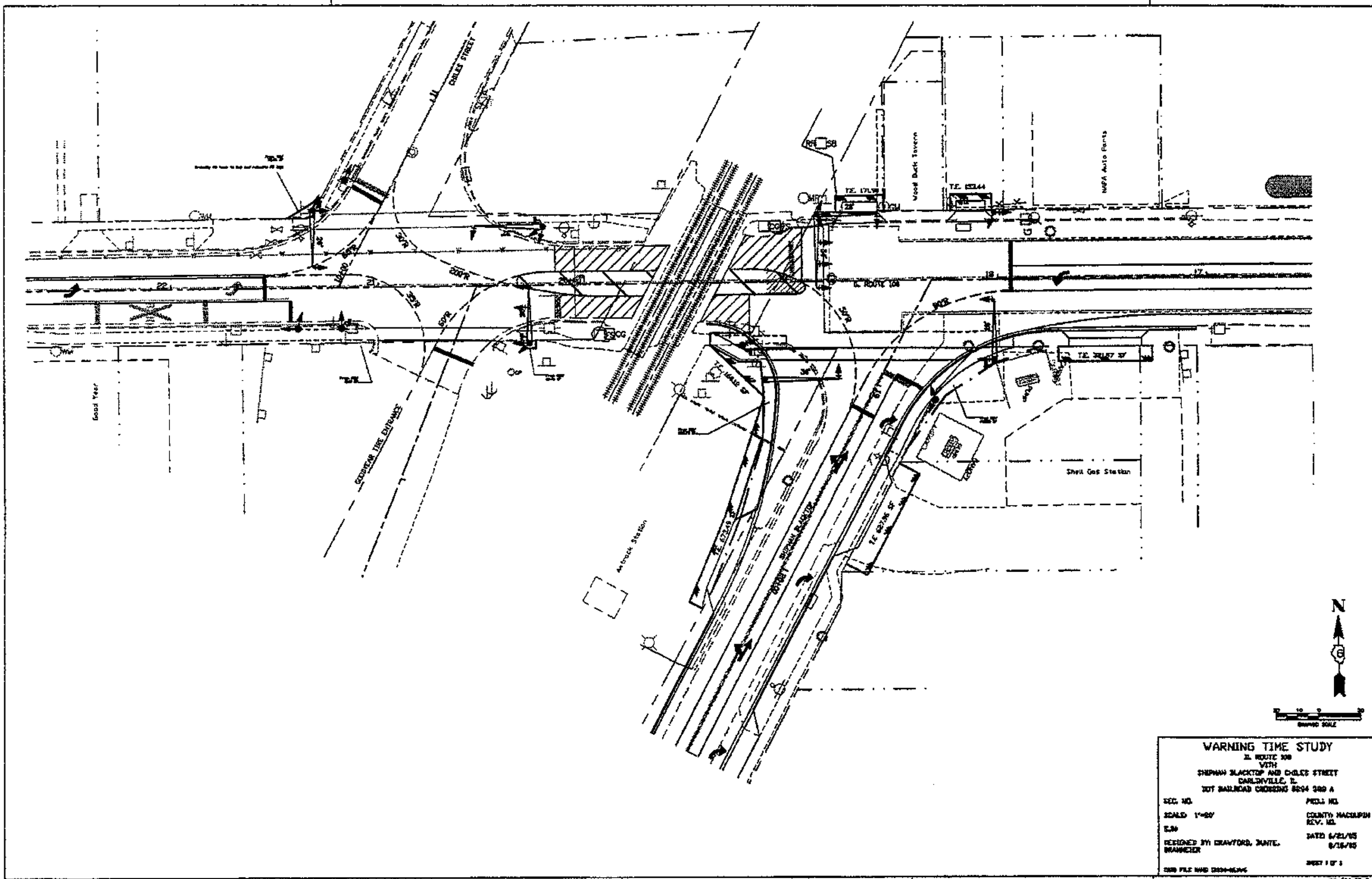
Queue Clearance Time - The time required for the design vehicle of maximum length stopped just inside the minimum track clearance distance to start up and move through and clear the entire minimum track clearance distance. If presignals are present, this time shall be long enough to allow the vehicle to move through the intersection, or to clear the tracks if there is sufficient clear storage distance.

Minimum Track Clear Distance (MTCD) - For standard two-quadrant railroad warning devices, the minimum track clearance distance is the length along a highway at one or more railroad tracks, measured either from the highway stop line, warning device, or 12□perpendicular to the tracker centerline, to 6□beyond the track measured perpendicular to the far rail, along the centerline or edge line of the highway , as appropriate, to obtain the longer distance.

Clear Storage Distance (CSD) - The distance available for vehicle storage measured between 6□from the rail nearest the intersection to the intersection stop line or the normal stopping point on the highway.

Separation Time □The component of maximum highway traffic signal preemption time during which the minimum tack clearance distance is clear of vehicular traffic prior to the arrival of the train.

* - As contained in the Manual on Uniform Traffic Control Devices (2003 Edition)


WARNING TIME STUDY
IL ROUTE 108
WITH
SHIPMAN BLACKTOP AND CHILES STREET
CARLINVILLE, IL
SEC. NO.
SCALE: 1"=20'
DESIGNED BY: CRAWFORD, DUNTE, BRANNECIER
COUNTY: MACOUPIN
REV. NO.
DATE: 6/21/05
GRAPHIC SCALE
N
NAPA Auto Parts
Wood Duck Tavern
Shell Gas Station
Amtrack Station
Good Year
GOODYEAR TIRE ENTRANCE
CHILES STREET
SHIPMAN BLACKTOP
IL ROUTE 108